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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,455	09/08/2003	Toivo T. Kudas	41890-01663	9806

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EXAMINER


VINCENT, SEAN E

ART UNIT	PAPER NUMBER
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1731

DATE MAILED: 12/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/657,455	Applicant(s) KODAS ET AL. 	
	Examiner Sean E. Vincent	Art Unit 1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 37-58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 37-58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### *Claim Objections*

1. Claim 37 is objected to because of the following informalities: boroaluminosilicate is misspelled. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
4. Claims 37-48, 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ranade et al (US 6000241) in view of Chronister (US 5106304).
5. Col. 2, line 4 to col. 3, line 14 states (emphasis added):

(23) A process for preparing barium **aluminoborosilicate** powder according to the invention includes the steps of:

(24) **atomizing** a stable precursor solution of ingredients necessary to form barium aluminoborosilicate glass into a mixture of fine droplets and oversized droplets and carrying said mixture in a **carrier gas**;

(25) **separating** the oversized droplet stream from a fine droplet stream based on differences in inertia between said fine droplets and said oversized droplets; concentrating the fine droplets in a virtual impactor; and

(26) **pyrolyzing** said fine droplets to form aluminoborosilicate powder.

(27) The precursor solution of the invention is sufficiently stable to permit the economic use of spray pyrolysis techniques to make fine, spherical powders of high purity with sufficiently uniform refractive index values (**preferably about 1.577**) to allow use of the powder in **dental composites**.

6. Col. 3, lines 39-47 state (emphasis added):

The water soluble barium source is preferably a salt selected from the group consisting of **barium nitrate** ( $\text{Ba}(\text{NO}_3)_2$ ), barium hydroxide ( $\text{Ba}(\text{OH})_2$ ), or barium acetate.  $\text{Ba}(\text{CH}_3\text{COOH})_2$

**Boric acid** is commercially available in a variety of concentrations and purities. Preferably, reagent grade boric acid is used to minimize contaminants that might hinder suitability for use in dental composites.

7. Col. 5, lines 7-12 state (emphasis added):

The resulting flow of desired size droplets is then conveyed to a pyrolyzer operating at a suitably high temperature to form a fine, white product powder having a refractive index within the range of 1.5-1.6. **Suitable temperatures are within the range of 1000°C –1600°C with a temperature of about 1400°C being particularly useful.**

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8. Example 1 of Ranade et al also disclosed the use of colloidal silica, ultrasonic atomization, compressed air and aluminum nitrate.

9. Ranade et al did not teach treating the glass powder to increase its surface area.

Chronister taught methods of making dental restorations with a discussion of the known methods of treating glass filler particles. Col. 2, lines 4-8 stated (emphasis added):

Work time and set time can also be adjusted **by affecting the surface area of the glass particles**, such as by **etching with an acid** and thoroughly washing the treated glass to leave substantially no soluble calcium salts on the surface of the glass particles.

10. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the etching treatment of Chronister on the powders of Ranade et al because Chronister taught that such treatment made work and set times adjustable. Chronister did not teach increasing the surface area by at least 100 percent. The specific process conditions recited are not critical but are merely optimal for the particular material being treated and they would be within the skill of the art to determine. A person of skill in the art would have conducted the etching treatment for as long as necessary to achieve a desired surface area increase.

11. Ranade et al does not teach that the glass particles have no greater than 0.1 atomic percent impurities. It would have been obvious to a person skilled in the art at the time the invention was made to make the glass particles with less than 0.1 atomic percent impurities because applicant is not entitled to a patent for an article which after being produced has a greater degree of purity than a product of former methods, see *In re Merz*, 38 U.S.P.Q. 143.

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12. Ranade et al does not teach that the glass particles are 95% of the theoretical density. It would have been obvious to a person skilled in the art at the time the invention was made to make the particles 95% of their theoretical density because as particles, the glass would become 100% dense merely by permitting the droplets to fully react and coalesce.

13. Ranade et al does not teach that the particle size distribution had no greater than 30 weight percent of the droplets in the aerosol larger than twice the weight average droplet size. It would have been obvious to a person skilled in the art at the time the invention was made to produce such a particle size distribution because the statistical composition of the particle sizes was controllable with the disclosed droplet classification means, i.e. virtual impactor and/or inertial separators.

14. Claims 49, 50 and 53 rejected under 35 U.S.C. 103(a) as being unpatentable over Ranade et al in view of Chronister as applied to claim 37 above, and further in view of Muller (US 3973972).

15. Ranade et al and Chronister failed to disclose annealing or coating of the glass powders. Muller taught annealing annealing glass powder filler for use in dental restorations. Col. 4, lines 1-14 stated (emphasis added):

The conversion of these glass ceramics from the glassy into the partially crystalline condition is straight-forward; it is sufficient to heat the glass at a rate of about 6.degree./minute or less from a temperature of about 0.degree.C to 600.degree.C, to temperatures of at least 800.degree. C. and at most about 900.degree. C., and to leave the glass at this final temperature for annealing for about 1 to 5 hours. Annealing can be conducted at lower temperatures, but

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longer annealing times are required, for example about 10 hours at 750.degree.

C. The extremely high number of nuclei necessary to obtain a transparent glass ceramic is attained very rapidly with these glasses, i.e. during the heating step, and thus does not require any special measures.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to anneal the powders of Ranade et al or Chronister because Muller taught that glass ceramic powders were desirable for dental restorations. Muller also taught "silanizing" and coating the powders with resin in col. 4, lines 26-31(emphasis added):

The glass ceramics can be **silanized** in the usual manner, as has also been done in the fillers utilized heretofore, **to provide good adhesion to the synthetic resin**. The particle size of the glass ceramics for dental purposes is usually in the range of 5 to 100, preferably 5 to 60 microns.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to coat the glass powders of Ranade et al and Chronister with resin because this was part of the process of building a dental restoration. Further, It would have been obvious to a person of ordinary skill in the art at the time the invention was made to silanate the powders to promote adhesion with the resin.

16. Claims 54-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ranade et al and Chronister as applied to claim 37 above, and further in view of Boyan et al (US 5977204).

17. Ranade et al and Chronister did not teach hydrolyzing the glass powder. Boyan et al taught controlling the pH of a solution contacting a glass in order to control the hydroxyl concentration on the glass surface. It would have been obvious to a person of ordinary skill in



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the art at the time the invention was made to do this with the glass of Ranade et al because Boyan et al taught that controlling the pH of a solution in contact with a glass surface and controlling the hydroxyl concentration at the surface was important in making the glass bioactive.

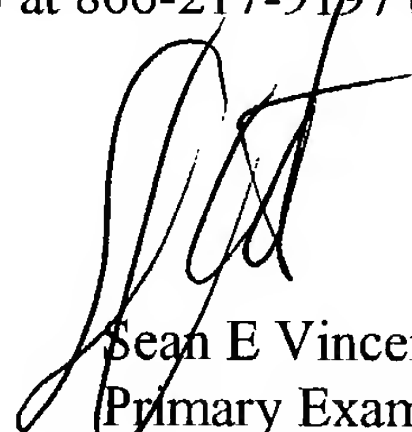
### ***Conclusion***

18. The prior art made of record and not relied upon is cited to further show the state of the art.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean E. Vincent whose telephone number is (571) 272-1194. The examiner can normally be reached on M - F (8:30 - 6:00).

20. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

21. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sean E Vincent  
Primary Examiner  
Art Unit 1731

S Vincent  
Monday, December 06, 2004